CLAIMS

I/We claim:

[c1]   1.   A method of processing contrast enhanced medical imaging information, the medical imaging information corresponding to a time dependent imaging signal behavior associated with at least one tissue volume, the method comprising:

automatically determining whether a portion of a tissue volume exhibits an imaging signal washout behavior;

automatically determining whether the portion of a tissue volume exhibits one from the group of an imaging signal plateau behavior and an imaging signal persistent enhancement behavior in the event that the portion of a tissue volume fails to exhibit an imaging signal washout behavior; and

identifying at least one likely malignancy within the portion of the tissue volume.

[c2]   2.   The method of claim 1, wherein identifying comprises generating a visual indication of a type of time dependent imaging signal behavior corresponding to the portion of a tissue volume.

[c3]   3.   The method of claim 1, wherein the medical imaging information comprises Magnetic Resonance Imaging data.

[c4]   4.   The method of claim 1, wherein the medical imaging information corresponds to a breast.

[c5]   5.   A method of processing contrast enhanced medical imaging information, the medical imaging information comprising imaging signal intensity values associated with at least one candidate voxel set corresponding to a tissue volume, the method comprising:

automatically determining whether a candidate voxel set exhibits an imaging signal washout behavior;

automatically determining whether a candidate voxel set exhibits one from the group of an imaging signal plateau behavior and an imaging signal persistent enhancement behavior in the event that a candidate voxel set fails to exhibit an imaging signal washout behavior; and

identifying a candidate voxel set as a likely malignancy.

[c6]   6.   The method of claim 5, wherein determining whether a candidate voxel set exhibits an imaging signal washout behavior comprises determining whether a signal enhancement ratio corresponding to a candidate voxel set exceeds a washout threshold value.

[c7]   7.   The method of claim 6, wherein the washout threshold value is approximately equal to 1.1.

[c8]   8.   The method of claim 5, wherein determining whether a candidate voxel set exhibits an imaging signal washout behavior comprises determining whether a slope corresponding to a candidate voxel set is less than a washout slope value.

[c9]   9.   The method of claim 8, wherein the washout slope value is approximately equal to –2.0 percentage units per minute.

[c10]   10.   The method of claim 5, wherein determining whether a candidate voxel set exhibits an imaging signal washout behavior comprises determining

whether an angle corresponding to a candidate voxel set is less than a washout angle value.

[c11]   11.   The method of claim 10, wherein the washout angle value is approximately equal to –5 degrees.

[c12]   12.   The method of claim 5, wherein identifying a candidate voxel set as a likely malignancy comprises identifying a highest percent enhancement value corresponding to a candidate voxel set.

[c13]   13.   The method of claim 5, wherein identifying a candidate voxel set as a likely malignancy comprises identifying a most significant imaging signal intensity decline corresponding to a candidate voxel set.

[c14]   14.   The method of claim 5, wherein identifying a candidate voxel set as a likely malignancy comprises identifying a most significant rate of imaging signal intensity decline corresponding to a candidate voxel set.

[c15]   15.   The method of claim 5, wherein identifying a candidate voxel set as a likely malignancy comprises generating at least one from the group of a numerical, a textual, a chromatic, and a graphic indication of the likely malignancy.

[c16]   16.   The method of claim 5, wherein identifying a candidate voxel set as a likely malignancy comprises generating upon a display device an indication of the likely malignancy.

[c17]   17.   The method of claim 5, wherein identifying a candidate voxel set as a likely malignancy comprises visually indicating a type of curve representing a time dependent imaging signal behavior that corresponds to the candidate voxel set.

[c18]   18.   The method of claim 5, wherein identifying a candidate voxel set as a likely malignancy comprises displaying one from the group of a washout curve, a plateau curve, and a persistent enhancement curve.

[c19]   19.   The method of claim 5, wherein determining whether a candidate voxel set exhibits an imaging signal plateau behavior comprises determining whether a signal enhancement ratio corresponding to a candidate voxel set is less than a first threshold value and greater than a second threshold value.

[c20]   20.   The method of claim 20, wherein the first threshold value is approximately equal to 1.1, and the second threshold value is approximately equal to 0.9.

[c21]   21.   The method of claim 5, wherein determining whether a candidate voxel set exhibits an imaging signal plateau behavior comprises determining whether a slope corresponding to a candidate voxel set is less than a first slope value and greater than a second slope value.

[c22]   22.   The method of claim 21, wherein the first slope value is approximately equal to 2 percentage units per minute and the second slope value is approximately equal to –2 percentage units per minute.

[c23]   23.   The method of claim 5, wherein determining whether a candidate voxel set exhibits an imaging signal plateau behavior comprises determining whether a slope corresponding to a candidate voxel set is less than a first angle value and greater than a second angle value.

[c24]   24.   The method of claim 23, wherein the first angle value is approximately equal to 5 degrees and the second angle value is approximately equal to –5 degrees.

[c25]   25.   The method of claim 5, wherein identifying a candidate voxel set as a likely malignancy comprises identifying a flattest imaging signal intensity relative to a time period.

[c26]   26.   The method of claim 5, wherein identifying a candidate voxel set as a likely malignancy comprises identifying a most strongly enhancing imaging signal intensity relative to a time period.

[c27]   27.   The method of claim 5, wherein determining whether a candidate voxel set exhibits an imaging signal persistent enhancement behavior is performed in the event that a candidate voxel set fails to exhibit an imaging singal washout behavior and a candidate voxel set fails to exhibit an imaging signal plateau behavior.

[c28]   28.   The method of claim 5, wherein the medical imaging information comprises Magnetic Resonance Imaging data.

[c29]   29.   The method of claim 5, wherein the medical imaging information corresponds to a breast.

[c30]   30.   A method of processing contrast enhanced medical imaging information, the medical imaging information comprising imaging signal intensity values associated with at least one candidate voxel set corresponding to a tissue volume, the method comprising:

automatically determining whether a candidate voxel set exhibits an imaging signal washout behavior;

automatically determining whether a candidate voxel set exhibits an imaging signal plateau behavior after determining whether a candidate voxel set exhibits an imaging signal washout behavior; and

identifying a candidate voxel set as a likely malignancy.

[c31]   31.   A method of processing contrast enhanced medical imaging information, the medical imaging information comprising imaging signal intensity values associated with at least one candidate voxel set corresponding to a tissue volume, the method comprising:

automatically determining whether a candidate voxel set exhibits an imaging signal washout behavior;

identifying a candidate voxel set as a likely malignancy corresponding to a washout behavior in the event that a candidate voxel set exhibits an imaging signal washout behavior;

automatically determining whether a candidate voxel set exhibits an imaging signal plateau behavior in the event that a candidate voxel set fails to exhibit an imaging signal washout behavior; and

identifying a candidate voxel set as a likely malignancy corresponding to a plateau behavior in the event that a candidate voxel set fails to exhibit an imaging signal washout behavior and exhibits an imaging signal plateau behavior.

[c32]   32.   The method of claim 31, further comprising identifying a candidate voxel set as a likely malignancy corresponding to a persistent enhancement behavior in the event that a candidate voxel set fails to exhibit an imaging signal washout behavior and a candidate voxel set fails to exhibit an imaging signal plateau behavior.

[c33]   33.   A system for processing contrast enhanced medical imaging information, the medical imaging information comprising imaging signal intensity values associated with at least one candidate voxel set corresponding to a tissue volume, the system comprising:

a processing unit; and

a computer readable medium containing program instructions for:

automatically determining whether a candidate voxel set exhibits an imaging signal washout behavior;

one from the group of:

automatically determining whether a candidate voxel set exhibits an imaging signal plateau behavior in the event that a candidate voxel set fails to exhibit an imaging signal washout behavior; and

automatically determining whether a candidate voxel set exhibits an imaging signal persistent enhancement behavior in the event that a candidate voxel set fails to exhibit an imaging signal washout behavior; and

identifying a candidate voxel set as a likely malignancy.

[c34]   34.   The system of claim 33, wherein the program instructions for determining whether a candidate voxel set exhibits an imaging signal washout behavior comprise program instructions for performing at least one from the group of a signal enhancement ratio analysis, an imaging signal intensity change analysis, and an imaging signal rate of intensity change.

[c35]   35.   The system of claim 33, wherein the program instructions for determining whether a candidate voxel set exhibits an imaging signal plateau behavior comprise program instructions for performing at least one from the group of a signal enhancement ratio analysis, an imaging signal intensity change analysis, and an imaging signal rate of intensity change analysis.

[c36]   36.   The system of claim 33, wherein the program instructions for identifying a candidate voxel set as a likely malignancy comprise program instructions for performing at least one from the group of a percent enhancement value analysis, an imaging signal intensity change analysis, and an imaging signal rate of intensity change analysis.

[c37]   37.   The system of claim 33, wherein the program instructions for identifying a candidate voxel set as a likely malignancy comprise program

instructions for generating at least one from the group of a numerical, a textual, a chromatic, and a graphic indication of the likely malignancy.

[c38]   38.   The system of claim 33, wherein the program instructions for identifying a candidate voxel set as a likely malignancy comprise program instructions for displaying a curve corresponding to the voxel set.

[c39]   39.   A computer readable medium containing program instructions for:

automatically determining whether a candidate voxel set that forms a portion of a medical imaging data set corresponding to a tissue volume exhibits an imaging signal washout behavior;

automatically determining whether a candidate voxel set that forms a portion of a medical imaging data set exhibits one from the group of an imaging signal plateau behavior and an imaging signal persistent enhancement behavior in the event that a candidate voxel set fails to exhibit imaging signal washout behavior; and

identifying a candidate voxel set as a likely malignancy.

[c40]   40.   The computer readable medium of claim 39, wherein the program instructions for determining whether a candidate voxel set exhibits an imaging signal washout behavior comprise program instructions for performing at least one from the group of a signal enhancement ratio analysis, an imaging signal intensity change analysis, and an imaging signal rate of intensity change analysis.

[c41]   41.   The system of claim 39, wherein the program instructions for determining whether a candidate voxel set exhibits an imaging signal plateau behavior comprise program instructions for performing at least one from the group of a signal enhancement ratio analysis, an imaging signal intensity change analysis, and an imaging signal rate of intensity change analysis.

[c42]   42.   The computer readable medium of claim 39, wherein the program instructions for identifying a candidate voxel set as a likely malignancy comprise program instructions for performing at least one from the group of a percent enhancement value analysis, an imaging signal intensity change analysis, and an imaging signal rate of intensity change analysis.

[c43]   43.   The computer readable medium of claim 39, wherein the program instructions for identifying a candidate voxel set as a likely malignancy comprise program instructions for generating at least one from the group of a numerical, a textual, a chromatic, and a graphic indication of the likely malignancy.

[c44]   44.   The computer readable medium of claim 39, wherein the program instructions for identifying a candidate voxel set as a likely malignancy comprise program instructions for displaying a curve corresponding to the candidate voxel set.